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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/429,295	10/28/1999	STEPHEN H. BROWN	10196-1-(125	5753

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EXXONMOBIL CHEMICAL COMPANY
P O BOX 2149
BAYTOWN, TX 775222149

EXAMINER
PREISCH, NADINE G

ART UNIT	PAPER NUMBER
1764	15

DATE MAILED: 01/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

A-2-15

Office Action Summary	Application No.	Applicant(s)	
	09/429,295	BROWN ET AL.	
	Examiner	Art Unit	
	Nadine Preisch	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *13* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Withdrawal of Claim Rejections Under 35 USC § 112

Applicants' arguments filed 1-9-02 in paper no.14 are sufficient to overcome the rejection of claim 14 under 35 USC 112.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazurek et al.(4,788,376) in view of Norris (5,157,201).

Applicants are claiming an oligomerization process which involves contacting a hydrocarbon feedstock containing sulfur with a hydrotreating catalyst in the absence of hydrogen. The dependent claims contain limitations directed at specific catalyst combinations and process conditions.

The reference of Mazurek et al.(4,788,376) discloses an oligomerization process. See column 1, lines 7-12. The process involves feeds including propylene. See column 2, lines 15-20. The feed can comprise a diene in an amount from 1-1000 ppm. See column 2, lines 23-25 and 32-36. The lower olefin feed is derived from pyrolysis gas. See column 1, lines 26-34. Mazurek et al.(4,788,376) teaches that it is within the scope of the invention to use "all" catalysts which are effective for the oligomerization of olefins to higher hydrocarbons. See column 4, lines 42-45. Suitable oligomerization catalysts include heterogeneous (solid) catalysts. See column 4, lines 48-51. The reference further teaches that "numerous catalysts are known for the conversion, e.g. oligomerization, of olefins.....other catalysts which have been employed for similar purposes include oxides of cobalt, nickel, chromium, molybdenum....on supports such as alumina. See column 4, lines 31-35. A metal supported catalyst can be combined with the oligomerization catalyst. See column 3, lines 11-20. The supported catalyst can be combined nickel and molybdenum on a support such as alumina. See column 3, lines 15-20 and 26-30.

Mazurek et al.(4,788,376) discloses process conditions including a temperature of 100-500°C (212-932°F), a pressure of 0.1 to 100 atm (1.5-1470 psig) and a WHSV of 0.2 to 20. See column 5, lines 59-67.

Mazurek et al.(4,788,376) succeeds at disclosing an oligomerization process which involves contacting a hydrocarbon feedstock with catalyst containing components corresponding to those claimed by applicants. In addition, the reference discloses overlapping process conditions. Since the reference does not disclose the use of hydrogen in the oligomerization zone, it is considered to disclose an oligomerization in the absence of hydrogen.

Several differences are noted between applicants' process and the reference of Mazurek et al.(4,788,376). The reference of Mazurek et al.(4,788,376) is silent about the feedstock containing sulfur. In addition, the reference is silent about the oligomerization of the sulfur containing molecules.

The reference of Norris (5,157,201) is cited for the general teaching that it is known in the art that higher olefin plants typically use a propylene feedstock which normally contains 5-50 ppm of various sulfur species. See column 1, lines 36-44. The reference further teaches that during the oligomerization, the sulfur species tend to become incorporated into the higher olefins. See column 1, lines 46-50. Note: The disclosure of "about" 50 ppm is considered to encompass greater than 50 ppm.

Since the process of Mazurek et al.(4,788,376) involves the production of higher hydrocarbons from propylene feed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize a propylene feedstock containing sulfur impurities because the reference of Norris (5,157,201) teaches that higher olefin plants typically use propylene feedstock which normally contains from "about" 5-50 ppm of various sulfur feeds. See column 1, lines 46-51. Correspondingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize any amount of sulfur which may be present in propylene feed because the reference of Norris (5,157,201) teaches that it is known that sulfur which may be present in the feed is incorporated into higher olefins. It would appear that any sulfur present, including 1% or 10,000 ppm, would also be incorporated into the final oligomer. Since it is known that sulfur present in the feed will become part of the oligomer, one of ordinary skill in the art desiring or willing to accept a higher level of sulfur in the oligomer

would process a feed with higher amounts of sulfur. Applicants have not demonstrated the criticality of 1% (10,000 ppm) sulfur in the feed. In addition, applicants' 95% sulfur conversion would naturally result from the process produced by the combined teachings of Mazurek et al. and Norris because the same conditions and feed amounts would yield a similar conversion percentage.

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any combination of metals and metal oxides in the disclosed catalyst, including applicants' NiMo/alumina or mixed NiMo or CoMo oxides, because the reference discloses that such metal/metal oxides are known to accomplish the desired conversion.

Claim Rejections - 35 USC § 103

Claims 1-5 and 8-15 rejected under 35 U.S.C. 103(a) as being unpatentable over Wilms et al. (4,098,839) in view Norris (5,157,201).

Applicants are claiming an oligomerization process which involves contacting a hydrocarbon feedstock containing sulfur with a hydrotreating catalyst in the absence of hydrogen. The dependent claims contain limitations directed at specific catalyst combinations and process conditions.

The reference of Wilms et al. (4,098,839) discloses a process for the oligomerization of unsaturated hydrocarbons including olefins with 2 to 5 carbons (C3 olefin = propylene). See column 1, lines 6-11. The process involves contacting a catalyst with the feed under conditions including 80 – 180° C (176-358° F), a pressure of 200-1500 psig and a weight hourly space

velocity (WHSV) of 0.8 to 2.5. See column 3, lines 42-45. Wilms et al. (4,098,839) discloses a catalyst containing an alumina support, molybdenum and one or more members from the group including cobalt and nickel. See column 2, lines 35-40 and 45-50. Wilms et al. (4,098,839) teaches that the catalyst composite is catalytically activated in an oxidizing atmosphere such as air or oxygen. See column 2, lines 60-65. The reference further teaches that the metals in the catalyst are converted to the oxide form. See column 3, lines 1-10. The reference discloses a specific example with cobalt oxide (CoO) and molybdenum oxide (MoO_3) on alumina. See column 4, lines 6-9. The catalysts can be used in a "liquid" phase process. See column 3, lines 53-54.

The reference of Wilms et al. (4,098,839) succeeds at disclosing a process for oligomerizing a hydrocarbon feedstock with a catalyst corresponding to applicants' mixed oxide catalyst, including an embodiment with mixed cobalt and molybdenum oxide on alumina. Since the reference does not disclose the use of hydrogen in the oligomerization reaction zone, it is considered to disclose an oligomerization in the absence of hydrogen.

Several differences are noted between applicants' process and the reference of Mazurek et al.(4,788,376). The reference of Wilms et al.(4,098,839) is silent about the feedstock containing sulfur. The reference is silent about the oligomerization of sulfur containing molecules. In addition, the reference discloses a maximum process temperature slightly lower than the minimum temperature claimed by applicants'.

The reference of Norris (5,157,201) is cited for the general teaching that it is known in the art that higher olefin plants typically use a propylene feedstock which normally contains "about" 5-50 ppm of various sulfur species. See column 1, lines 36-44. The reference further

teaches that during the oligomerization, the sulfur species tend to become incorporated into the higher olefins. See column 1, lines 46-50. Note: The disclosure of "about" 50 ppm is considered to encompass greater than 50 ppm.

Since the process of Wilms et al.(4,098,839) involves the use of a propylene feed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize a propylene feedstock containing sulfur impurities because the reference of Norris (5,157,201) teaches that higher olefin plants typically use propylene feedstock which normally contains about 5-50 ppm of various sulfur feeds. Correspondingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize any amount of sulfur which may be present in propylene feed because the reference of Norris (5,157,201) teaches that it is known that sulfur which may be present in the feed is incorporated into higher olefins. It would appear that any sulfur present, including 1% or 10,000 ppm, would also be incorporated into the final oligomer. Since it is known that sulfur present in the feed will become part of the oligomer, one of ordinary skill in the art desiring or willing to accept a higher level of sulfur in the oligomer would process a feed with higher amount of sulfur. Applicants have not demonstrated the criticality of 1% (10,000 ppm) sulfur in the feed. In addition, applicants' 95% sulfur conversion would naturally result from the process produced by the combined teachings of Mazurek et al. and Norris because the same conditions and feed amounts would yield a similar conversion percentage.

Applicants' slightly higher minimum temperature range is not considered to be a patentable distinction over the temperature range of Wilms et al.(4,098,839). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the upper

temperature range of Wilms et al.(4,098,839) would accomplish a similar conversion to the lower end of applicants' claimed temperature range because the temperatures are close enough that similar conversions would be accomplished. Applicants' have not submitted evidence of criticality with respect to the claimed range.

Claim Rejections - 35 USC § 103

Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over 1)Mazurek et al.(4,778,376) and Norris (5,157,201) or 2) Wilms et al. (4,098,839) and Norris (5,157,201) in view of Harandi (5,000,837).

See teachings and obvious statements above with respect to 1)Mazurek et al.(4,778,376) and Norris (5,157,201) or 2) Wilms et al. (4,098,839) and Norris (5,157,201).

It is noted that the modified teachings of Mazurek et al.(4,778,376) or Wilms et al.(4,098,839) do not disclose an FCC gasoline as the source of the olefins.

The reference of Harandi (5,000,837) illustrates that FCC gasoline is a known source of olefins. See column 2, lines 50-53.

Since the reference of Mazurek et al.(4,778,376) or Wilms et al.(4,098,839) do not limit the source of the olefins, it would have been obvious to one of ordinary skill in the art at the time the invention was made to obtain olefins from an FCC feed because the reference of Harandi (5,000,837) illustrates that FCC gasolines are known sources of olefins.

Response to Arguments

Applicants' arguments filed 1-9-02 in paper no.14 have been fully considered but they are not persuasive.

Applicants' argument that the examiner incorrectly refers to Mazurek instead of Norris as teaching the removal of sulfur in the passage on page 4, lines 21-26 is not persuasive in overcoming the rejection. In response, it is unclear which passage applicants are referring to because page 4 of the office action only has 21 lines.

Applicants' argument that Norris fails to disclose or suggest the subject matter of claims which require greater than 50 ppm sulfur is not persuasive in overcoming the rejection because the reference discloses "about" 50 ppm. The term "about" encompasses amounts slightly greater than 50 ppm.

Applicants' argument that one skilled in applying the art of Norris to Mazurek would not employ the high temperatures required by the present invention because Norris suggests adsorption of sulfur containing species at lower temperatures is not persuasive. In response, it is maintained that the combination of Norris and Mazurek suggest applicants' temperature range because the primary reference of Mazurek teaches such a temperature. The secondary reference of Norris was relied on to teach the conventionality of sulfur in the feed and not the temperature as interpreted by applicants. Since the primary reference succeeds in teaching overlapping conversion temperatures, the combined teachings are considered to encompass applicants' temperature range.

Applicants' argument in response to the examiner's argument that "one can not distinguish the claims by differences not in the claims" is not persuasive. Applicants assert that

the claims distinguish over the reference because claim 3 requires oligomerizing sulfur compounds which would result in differences between the products formed in the absence or presence of sulfur. In response, it is maintained that the combined teachings suggest oligomerizing in the presence of sulfur. Since the combined teachings encompass oligomerization in the presence of sulfur, it is maintained that similar conversion would occur.

Applicants' argument that Wilms and Norris fail to disclose or suggest the higher operating temperatures as required by the claims was addressed in the rejection above. Applicants' did not respond to the examiner's statement of obviousness.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nadine Preisch whose telephone number is 703-305-2667. The examiner can normally be reached on Monday through Thursday from 7:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703-308-4311. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-5408 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

N.P.
January 22, 2002

NADINE PREISCH
ART UNIT 1764